CLAIMS

What is claimed is:

1	1.	An exhaust-vibration decoupling connector comprising:
2		an inlet tube extended downstream from a decoupler inlet to proximate
3	an upstream	portion of a damper fixture, said inlet tube having outlet radial bend
4	around a circ	sumference on an upstream end to interlock with an outlet tube;
5		an outlet tube extended upstream from a decoupler outlet to proximate
6	a downstream	n portion of the damper fixture, said outlet tube having an inward radial
7	bend on a do	wnstream end which interlocks with the bend on the inlet tube;
8		the damper fixture being proximate midway between the decoupler inlet
9	and the deco	upler outlet;
10		a vibration damper positioned removably in the damper fixture;
11		a bellows having an upstream bellows attachment proximate the
12	decoupler in	let;
13		the bellows having a downstream bellows attachment proximate the
14	decoupler ou	ıtlet;
15		the bellows having a bellows inside perimeter that is positioned radially
16	outward pred	leterminedly from a radially outside perimeter of the vibration damper;
17		the bellows inside perimeter including inside peripheries of undulations
18	of the bellow	vs;
19		a flex cover having an upstream flex attachment proximate the decoupler
20	inlet;	,
21		the flex cover having a downstream flex attachment proximate the
22	decoupler ou	itlet;
23		the flex cover having a cover inside perimeter that is positioned
24	proximate a	bellows outside perimeter;
25		a shield sleeve having a shield attachment proximate the decoupler
26	outlet; and	

the shield sleeve having a shield inside perimeter that is position	ned
radially outward predeterminedly from a radially outside perimeter of the flex cov	ver.

2. The exhaust-vibration decoupling connector of claim 1 wherein:

the upstream bellows attachment includes an upstream bellows sleeve extending downstream axially a predetermined attachment distance from proximate the decoupler inlet to a first undulation wall that is extended radially intermediate the upstream bellows sleeve and a first side of a first undulation of the bellows;

the downstream bellows attachment includes a downstream bellows sleeve extending upstream axially a predetermined attachment distance from proximate the decoupler outlet to a second undulation wall that is extended radially intermediate the downstream bellows sleeve and a second side of a last undulation of the bellows;

the upstream bellows sleeve includes an inside periphery that is positioned removably on an outside periphery of a fastener portion of the inlet tube; and

the downstream bellows sleeve includes an inside periphery that is positioned removably on an outside periphery of a fastener portion of the outlet tube.

3. The exhaust-vibration decoupling connector of claim 2 wherein:

the upstream flex attachment includes an upstream flex-cover sleeve extending downstream axially a predetermined attachment distance from proximate the decoupler inlet to a first flex-cover wall that is extended radially intermediate the upstream flex-cover sleeve and a first attachment side of the flex cover; and

the downstream flex attachment includes a downstream flex-cover sleeve extending upstream axially a predetermined attachment distance from proximate the decoupler outlet to a second flex-cover wall that is extended radially intermediate the downstream flex-cover sleeve and a second attachment side of the flex cover.

positioned removably on an outside periphery of the upstream bellow the downstream flex-cover sleeve includes an inside per positioned removably on an outside periphery of the downstream bell The exhaust-vibration decoupling connector of claim 1 v the inlet tube is circumferential with an inside periphery a periphery; the outlet tube is circumferential with an inside periphery a periphery; the inside periphery and the outside periphery of the predeterminedly smaller than the inside periphery and the outside pe outlet tube; the damper fixture includes an inlet-tube step extended ra to a damper seat having an axial downstream extension of the inlet tu the damper fixture includes an outlet-tube step extended ra to predeterminedly proximate an outside periphery of the damper seat the inlet-tube step includes a first side of the damper fixt the outlet-tube step includes a second side of the damper	1	4.	The exhaust-vibration decoupling connector of claim 3 wherein:
the downstream flex-cover sleeve includes an inside per positioned removably on an outside periphery of the downstream bell The exhaust-vibration decoupling connector of claim 1 verification the inlet tube is circumferential with an inside periphery and periphery; the outlet tube is circumferential with an inside periphery and periphery; the inside periphery and the outside periphery of the predeterminedly smaller than the inside periphery and the outside periphery and the damper fixture includes an inlet-tube step extended rate to a damper seat having an axial downstream extension of the inlet turn the damper fixture includes an outlet-tube step extended rate to predeterminedly proximate an outside periphery of the damper seat the inlet-tube step includes a first side of the damper fixt the outlet-tube step includes a second side of the damper The exhaust-vibration decoupling connector of claim 5 verifications the outlet-tube step is articulated to allow axial and pivotate the outlet-tube step is articulated to allow axial and pivotate the outlet-tube step is articulated to allow axial and pivotate the outlet-tube step is articulated to allow axial and pivotate the outlet-tube step is articulated to allow axial and pivotate the outlet-tube step is articulated to allow axial and pivotate the outlet-tube step is articulated to allow axial and pivotate the outlet-tube step is articulated to allow axial and pivotate the outlet-tube step is articulated to allow axial and pivotate the outlet-tube step is articulated to allow axial and pivotate the outlet-tube step is articulated to allow axial and pivotate the outlet-tube step is articulated to allow axial and pivotate the outlet-tube step is articulated to allow axial and pivotate the outlet-tube step is articulated to allow axial and pivotated to allow axial ax	2		the upstream flex-cover sleeve includes an inside periphery that is
5 positioned removably on an outside periphery of the downstream bell 1	3	positioned 1	emovably on an outside periphery of the upstream bellows sleeve; and
the inlet tube is circumferential with an inside periphery a periphery; the outlet tube is circumferential with an inside periphery a periphery; the outlet tube is circumferential with an inside periphery a periphery; the inside periphery and the outside periphery of the predeterminedly smaller than the inside periphery and the outside periphery and the outlet-tube step includes an inlet-tube step extended rate to a damper seat having an axial downstream extension of the inlet tube to predeterminedly proximate an outside periphery of the damper seat the inlet-tube step includes a first side of the damper fixt the outlet-tube step includes a second side of the damper the outlet-tube step includes a second side of the damper the outlet-tube step includes a second side of the damper seat the outlet-tube step includes a second side of the damper the outlet-tube step includes a second side of the damper seat the outlet-tube step includes a second side of the damper seat the outlet-tube step includes a second side of the damper seat the outlet-tube step includes a second side of the damper seat the outlet-tube step includes a second side of the damper seat the outlet-tube step includes a second side of the damper seat the outlet-tube step includes a second side of the damper seat the outlet-tube step includes a second side of the damper seat the outlet-tube step includes a second side of the damper seat the outlet-tube step includes a second side of the damper seat the outlet-tube step includes a second side of the damper seat the outlet-tube step includes a second side of the damper seat the outlet-tube step includes a second side of the damper seat the outlet-tube step includes a sec	4		the downstream flex-cover sleeve includes an inside periphery that is
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the outlet tube is circumferential with an inside periphery as periphery; the inside periphery and the outside periphery of the predeterminedly smaller than the inside periphery and the outside periphery outlet tube; the damper fixture includes an inlet-tube step extended rate to a damper seat having an axial downstream extension of the inlet ture the damper fixture includes an outlet-tube step extended rate to predeterminedly proximate an outside periphery of the damper seat the inlet-tube step includes a first side of the damper fixt the outlet-tube step includes a second side of the damper the outlet-tube step includes a second side of the damper the outlet-tube step is articulated to allow axial and pivotate.	1	5.	The exhaust-vibration decoupling connector of claim 1 wherein:
the outlet tube is circumferential with an inside periphery as periphery; the inside periphery and the outside periphery of the predeterminedly smaller than the inside periphery and the outside periphery of the damper fixture includes an inlet-tube step extended rate to a damper seat having an axial downstream extension of the inlet turn the damper fixture includes an outlet-tube step extended rate to predeterminedly proximate an outside periphery of the damper seat the inlet-tube step includes a first side of the damper fixture the outlet-tube step includes a second side of the damper fixture the outlet-tube step includes a second side of the damper fixture the outlet-tube step includes a second side of the damper fixture the outlet-tube step includes a second side of the damper fixture the outlet-tube step includes a second side of the damper fixture the outlet-tube step includes a second side of the damper fixture the outlet-tube step includes a second side of the damper fixture the outlet-tube step includes a second side of the damper fixture the outlet-tube step includes a second side of the damper fixture the outlet-tube step includes a second side of the damper fixture the outlet-tube step includes a second side of the damper fixture the outlet-tube step includes a second side of the damper fixture the outlet-tube step includes a second side of the damper fixture the outlet-tube step includes a second side of the damper fixture the outlet-tube step includes a second side of the damper fixture the outlet-tube step includes a second side of the damper fixture the outlet-tube step includes a second side of the damper fixture the outlet-tube step includes a second side of the damper fixture the outlet-tube step includes a second side of the damper fixture the outlet-tube step includes a second side of the damper fixture the outlet-tube step includes a second side of the damper fi	2		the inlet tube is circumferential with an inside periphery and an outside
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the damper fixture includes an inlet-tube step extended rate to a damper seat having an axial downstream extension of the inlet tu the damper fixture includes an outlet-tube step extended rate to predeterminedly proximate an outside periphery of the damper seat the inlet-tube step includes a first side of the damper fixt the outlet-tube step includes a second side of the damper fixt the outlet-tube step includes a second side of the damper the outlet-tube step is articulated to allow axial and pivotate.	6		the inside periphery and the outside periphery of the inlet tube are
the damper fixture includes an inlet-tube step extended rate to a damper seat having an axial downstream extension of the inlet turn the damper fixture includes an outlet-tube step extended rate to predeterminedly proximate an outside periphery of the damper seat the inlet-tube step includes a first side of the damper fixt the outlet-tube step includes a second side of the damper fixt the outlet-tube step includes a second side of the damper the outlet-tube step includes a second side of the damper the outlet-tube step is articulated to allow axial and pivotate.	7	predetermin	nedly smaller than the inside periphery and the outside periphery of the
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the damper fixture includes an outlet-tube step extended rate to predeterminedly proximate an outside periphery of the damper search the inlet-tube step includes a first side of the damper fixt the outlet-tube step includes a second side of the damper. 6. The exhaust-vibration decoupling connector of claim 5 very the outlet-tube step is articulated to allow axial and pivota	9		the damper fixture includes an inlet-tube step extended radially inward
to predeterminedly proximate an outside periphery of the damper sear the inlet-tube step includes a first side of the damper fixt the outlet-tube step includes a second side of the damper The exhaust-vibration decoupling connector of claim 5 v the outlet-tube step is articulated to allow axial and pivota	10	to a damper	seat having an axial downstream extension of the inlet tube;
the inlet-tube step includes a first side of the damper fixt the outlet-tube step includes a second side of the damper The exhaust-vibration decoupling connector of claim 5 v the outlet-tube step is articulated to allow axial and pivota	11		the damper fixture includes an outlet-tube step extended radially inward
the outlet-tube step includes a second side of the damper The exhaust-vibration decoupling connector of claim 5 v the outlet-tube step is articulated to allow axial and pivota	12	to predeterr	ninedly proximate an outside periphery of the damper seat;
1 6. The exhaust-vibration decoupling connector of claim 5 v 2 the outlet-tube step is articulated to allow axial and pivota	13		the inlet-tube step includes a first side of the damper fixture; and
2 the outlet-tube step is articulated to allow axial and pivota	14		the outlet-tube step includes a second side of the damper fixture.
•	1	6.	The exhaust-vibration decoupling connector of claim 5 wherein:
3 outlet tube in relation to the inlet tube predeterminedly.	2		the outlet-tube step is articulated to allow axial and pivotal travel of the
	3	outlet tube	in relation to the inlet tube predeterminedly.

1	7.	The exhaust-vibration decoupling connector of claim 5 wherein:	
2		the vibration damper includes a mesh-wire washer having an inside	
3	periphery t	hat is positioned removably on the damper seat, an outside periphery that	
4	is predetern	minedly smaller than the bellows inside periphery, a first side proximate	
5	the inlet-tu	be step and a second side proximate the outlet-tube step.	
1	8.	The exhaust-vibration decoupling connector of claim 5 wherein:	
2		the vibration damper includes a wave-spring damper having one or more	
3	wave spring	gs intermediate wave-spring washers in detachably sealed contact with the	
4	inlet-tube step and the outlet-tube step.		
1	9.	The exhaust-vibration decoupling connector of claim 5 wherein:	
2		the vibration damper includes a helical-spring damper;	
3		the helical-spring damper has a first side in detachable contact with the	
4	inlet-tube s	step and a second side in detachably contact with the outlet-tube step.	
1	10.	The exhaust-vibration decoupling connector of claim 5 wherein:	
2		the vibration damper includes a spring-side damper having a helical	
3	spring in a circumferential channel with a first wall adjacent to the inlet-tube step an		
4	a second wall adjacent to the outlet-tube step;		
5		the circumferential channel is arcuate intermediate the first wall and the	
6	second wall; and		
7		the first wall and the second wall have inside peripheries proximate the	

outside periphery of the damper seat.

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1	11.	The exhaust-vibration decoupling connector of claim 1 and further
2	comprising:	
3		the flex cover includes a heat-resistant and flexible material that is
4	reinforced v	vith wire network predeterminedly.
	10	The colour decides decoupling compostor of claim 1 subgrains
1	12.	The exhaust-vibration decoupling connector of claim 1 wherein:
2		the flex cover includes braided-wire material.
1	13.	The exhaust-vibration decoupling connector of claim 12 wherein:
2		the flex cover includes a braid cap that is positioned intermediate the
3	upstream fle	ex attachment and exhaust-outlet structure to which the exhaust-vibration
4	-	connector is attachable.
1	14.	The exhaust-vibration decoupling connector of claim 1 wherein:
2		the upstream bellows attachment is articulated for sealed attachment to
3	a predeterm	ined exhaust-outlet structure; and
4		the downstream bellows attachment is articulated for sealed attachment
5	to a predetermined exhaust-treatment structure that is fluidly downstream from the	
6	exhaust-out	let structure.
	15	The subscript without an decoupling comportor of claim 12 wherein.
1	15.	The exhaust-vibration decoupling connector of claim 13 wherein:
2		the upstream bellows attachment is disposed a snug-fit distance from the
3	downstream	bellows attachment for fitting snugly intermediate the exhaust-outlet
4	structure an	d the exhaust-treatment structure predeterminedly.

1	16.	The exhaust-vibration decoupling connector of claim 15 wherein:
2		the shield sleeve has a shield length that is less than the snug-fit distance
3	for allowin	g axial distance change between the decoupler inlet and the decoupler
4	outlet and	for allowing pivotal movement of the decoupler outlet predeterminedly.
1	17.	The exhaust-vibration decoupling connector of claim 1 wherein:
2		the bellows includes flexibly parallel walls intermediate arcuately
3	flexible flo	ors and roofs.
1	18.	The exhaust-vibration decoupling connector of claim 17 wherein:
2		the bellows includes oppositely disposed ends that are buttressed against
3	oppositely	disposed end walls of the flex cover.
1	19.	The exhaust-vibration decoupling connector of claim 1 wherein:
2		the bellows includes damping filler intermediate internal walls of
3	undulation	s of the bellows.
1	20.	The exhaust-vibration decoupling connector of claim 19 wherein:
2		the damping filler includes mesh wire.

1	21. An exhaust-vibration decoupling connector comprising:	
2	an inlet tube extended downstream from an upstream portion of the	ne inlet
3	tube proximate a decoupler inlet to proximate an upstream portion of a continuous contin	lamper
4	fixture, said inlet tube having outward radial bend around a circumference	on an
5	upstream end to interlock with an outer tube;	
6	an outlet tube extended upstream from a downstream portion	of the
7	outlet tube proximate a decoupler outlet to proximate a downstream portion	of the
8	damper fixture, said outlet tube having an inward radial bend on a downstrea	ım end
9	which interlocks with the bend on the inlet tube;	
10	the damper fixture being proximate midway between the decoupl	er inlet
11	and the decoupler outlet;	
12	a vibration damper positioned removably in the damper fixture;	
13	a bellows having an upstream bellows attachment proxima	ite the
14	decoupler inlet;	
15	the bellows having a downstream bellows attachment proxim	ate the
16	decoupler outlet;	
17	the bellows having a bellows inside perimeter that is positioned r	adially
18	outward predeterminedly from a radially outside perimeter of the vibration d	amper;
19	the bellows inside perimeter including inside peripheries of the be	ellows;
20	a flex cover having an upstream flex attachment proximate the decouple	r inlet;
21	the flex cover having a downstream flex attachment proxima	ate the
22	decoupler outlet; and	
23	the flex cover having a cover inside perimeter that is pos-	itioned
24	proximate a bellows outside perimeter.	

1	22.	The exhaust-vibration decoupling connector of claim 21 wherein:
2		the upstream bellows attachment includes an upstream bellows sleeve
3	extending d	lownstream axially a predetermined attachment distance from proximate
4	the decoupl	er inlet to a first undulation wall that is extended radially intermediate the
5	upstream be	ellows sleeve and a first side of a first undulation of the bellows;
6		the downstream bellows attachment includes an downstream bellows
7	sleeve exte	ending upstream axially a predetermined attachment distance from
8	proximate t	he decoupler outlet to a second undulation wall that is extended radially
9	intermediat	e the downstream bellows sleeve and a second side of a last undulation of
10	the bellows	;
11		the upstream bellows sleeve includes an inside periphery that is
12	positioned	removably on an outside periphery of a fastener portion of the inlet tube;
13		the downstream bellows sleeve includes an inside periphery that is
14	positioned	removably on an outside periphery of a fastener portion of the outlet tube;
15		the inlet tube is circumferential with an inside periphery and an outside
16	periphery;	"
17		the outlet tube is circumferential with an inside periphery and an outside
18	periphery;	
19		the inside periphery and the outside periphery of the inlet tube are
20	predetermi	nedly smaller than the inside periphery and the outside periphery of the
21	outlet tube;	
22		the damper fixture includes an inlet-tube step extended radially inward
23	to a damper	r seat having an axial downstream extension of the inlet tube;
24		the damper fixture includes an outlet-tube step extended radially inward
25	to predeter	minedly proximate an outside periphery of the damper seat;
26		the inlet-tube step includes a first side of the damper fixture; and
27		the outlet-tube step includes a second side of the damper fixture.

1	23.	The exhaust-vibration decoupling connector of claim 22 wherein:	
2		the outlet-tube step is articulated to allow axial and pivotal travel of the	
3	outlet tube	in relation to the inlet tube predeterminedly.	
1	24.	The exhaust-vibration decoupling connector of claim 22 wherein:	
2		the vibration damper includes a mesh-wire washer having an inside	
3	periphery th	nat is positioned removably on the damper seat, an outside periphery that	
4	is predetern	ninedly smaller than the bellows inside periphery, a first side proximate	
5	the inlet-tube step, and a second side proximate the outlet-tube step.		
1	25.	The exhaust-vibration decoupling connector of claim 22 wherein:	
2		the vibration damper includes a helical-spring damper;	
1	26.	The exhaust-vibration decoupling connector of claim 22 wherein:	
2		the vibration damper includes a wave-spring damper.	
1	27.	The exhaust-vibration decoupling connector of claim 22 wherein:	
2		the vibration damper includes a spring-side damper having a helical	
3	spring in a c	ircumferential channel with a first wall adjacent to the inlet-tube step and	
4	a second wa	all adjacent to the outlet-tube step;	
5		the circumferential channel is arcuate intermediate the first wall and the	
6	second wall	; and	
7		the first wall and the second wall have inside peripheries proximate the	
8	outside peri	phery of the damper seat.	
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1	28.	The exhaust-vibration decoupling connector of claim 21 wherein:		
2		the upstream bellows attachment is articulated for sealed attachment to		
3	a predeterm	a predetermined exhaust-outlet structure; and		
4		the downstream bellows attachment is articulated for sealed attachment		
5	to a predete	rmined exhaust-treatment structure that is fluidly downstream from the		
5	exhaust-out	let structure.		
1	29.	The exhaust-vibration decoupling connector of claim 21 wherein:		
2		the upstream bellows attachment is disposed a snug-fit distance from the		
3	downstream	n bellows attachment for fitting snugly intermediate the exhaust-outlet		
4	structure an	d the exhaust-treatment structure predeterminedly.		
1	30.	The exhaust-vibration decoupling connector of claim 21 wherein:		
2	•	the bellows includes flexibly parallel walls intermediate arcuately		
3	flexible floo	ors and roofs.		
1	31.	The exhaust-vibration decoupling connector of claim 21 wherein:		
2		the bellows includes damping filler intermediate internal walls of		
3	undulations	of the bellows.		

The exhaust-vibration decoupling connector of claim 21 wherein:

the damping filler includes mesh-wire rings.

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